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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/853,114	05/10/2001	Henry Allen Hill	0219/US	5210

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EXAMINER

ALLEN, STEPHONE B

ART UNIT

PAPER NUMBER

2878

DATE MAILED: 07/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/853,114

Applicant(s)

HILL, HENRY ALLEN

Examiner

Stephone B. Allen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 April 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 19 and 20 is/are allowed.
- 6) ☒ Claim(s) 1-4, 6-13 and 15-18 is/are rejected.
- 7) ☒ Claim(s) 5 and 14 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Applicant's arguments with respect to claims 1-20 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 4, 8-11, 13 and 17-18 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,363,196 to Cameron.

With respect to claims 1, 2, 4, 10, 11 and 13, Cameron discloses an interferometric apparatus and method comprising a means for defining a reference frame; a translation stage and an electro-mechanical arrangement for selectively translating the translation stage in at least one of at least two orthogonal directions with respect to the reference frame 100 (X-Y movable stage); at least one thin, elongated mirror 204, 206 mounted in a predetermined manner with respect to the reference frame (mounted on the translation stage), the at least one thin, elongated mirror having a reflecting surface and a nominal datum line extending along its longitudinal dimension; at least one interferometer subsystem 207,214 mounted in a predetermined manner with respect to the at least one mirror (mounted off the translation stage); adapted to cooperate with the at least one mirror to measure the displacement of the translation

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stage in at least one azimuth; and adapted to measure the slope of the at least one mirror along and orthogonal to its datum line and its local displacement normal to the reflecting surface; control means 102 having a mode of operation for selectively translating the translation stage, the at least one mirror and the at least one interferometer subsystem moving relative to one another in the mode of operation so that the at least one interferometer subsystem scans the at least one mirror along its corresponding datum line to generate a signal containing information indicative of the angular change and surface departure of the reflecting surface thereof along with any contributions thereto due to variations present from the electro-mechanical arrangement; and signal and analysis means for extracting the information contained in the signal and determining the local shape of the at least one mirror while the control means is in the mode of operation. The interferometric method is inherent to the interferometric apparatus as claimed above.

With respect to claims 8, 9, 17 and 18, Cameron discusses a wafer mounted on the stage and a photolithographic exposure unit mounted to the reference frame for forming masked patterns on wafers mounted on the stage (Fig. 3; col. 3, line 32 – col. 4, line 10).

Claims 1, 2, 4, 8-11, 13 and 17-18 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,151,749 to Tanimoto et al. (Tanimoto).

With respect to claims 1, 2, 4, 10, 11 and 13, Tanimoto discloses an interferometric apparatus and method comprising a means for defining a reference

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frame; a translation stage and an electro-mechanical arrangement for selectively translating the translation stage in at least one of at least two orthogonal directions with respect to the reference frame ST; at least one thin, elongated mirror MX, MY mounted in a predetermined manner with respect to the reference frame (mounted on the translation stage), the at least one thin, elongated mirror having a reflecting surface and a nominal datum line extending along its longitudinal dimension; at least one interferometer subsystem XI, YI mounted in a predetermined manner with respect to the at least one mirror (mounted off the translation stage); adapted to cooperate with the at least one mirror to measure the displacement of the translation stage in at least one azimuth; and adapted to measure the slope of the at least one mirror along and orthogonal to its datum line and its local displacement normal to the reflecting surface; control means 50 having a mode of operation for selectively translating the translation stage, the at least one mirror and the at least one interferometer subsystem moving relative to one another in the mode of operation so that the at least one interferometer subsystem scans the at least one mirror along its corresponding datum line to generate a signal containing information indicative of the angular change and surface departure of the reflecting surface thereof along with any contributions thereto due to variations present from the electro-mechanical arrangement; and signal and analysis means for extracting the information contained in the signal and determining the local shape of the at least one mirror while the control means is in the mode of operation. The interferometric method is inherent to the interferometric apparatus as claimed above.

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With respect to claims 8, 9, 17 and 18, Tanimoto discloses a wafer W mounted on the stage and a photolithographic exposure unit mounted to the reference frame for forming masked patterns on wafers mounted on the stage.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3, 6, 7, 12, 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cameron or Tanimoto.

With respect to claims 3 and 12, Both Cameron and Tanimoto are silent as to the at least one interferometer sub system being fixedly mounted to the translation stage for movement therewith and the at least one mirror is fixedly mounted off the translation stage. However, it would have been obvious for one of ordinary skill in the art to modify the invention so as to dispose the claimed elements as is presently claimed so as to insure that vibration or other interferences would not inhibit accuracy of the measurement.

With respect to claims 6 and 15, Both Cameron and Tanimoto disclose a laser interferometer, but is silent as to it being a single, beam plane mirror. It well known in the art that a laser interferometer may be designed to be a single beam, plane mirror

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interferometer subsystem and it would not be above ordinary skill in the art for one to design the interferometer as such, since they are functionally equivalent.

With respect to claims 7 and 16, Both Cameron and Tanimoto fail to wherein the interferometric apparatus comprises three orthogonally arranged thin, elongated mirrors and three corresponding interferometer subsystems mounted for relative motion with respect to one another while the control means is in the mode of operation to measure the local shape of the mirrors in three directions. Cameron does disclose the use of two interferometer subsystems and two elongated mirrors. It would have been obvious for one having ordinary skill in the art to include an additional interferometer subsystem and an additional elongated mirror, since it had been held that a mere duplication of parts of a device involves only routine skill in the art.

Allowable Subject Matter

Claims 5 and 14 remain objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

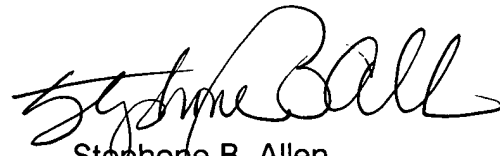
Claims 19 and 20 are allowable because they are the objected to claims above rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephone B. Allen whose telephone number is (703) 308-4828. The examiner can normally be reached on M-Th 9-4.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dave Porta can be reached on (703) 308-4852. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.



Stephone B. Allen
Primary Examiner

sba
July 14, 2003